

REMARKS

This application has been reviewed in light of the Office Action dated February 12, 2004. Claims 1, 3 - 5, and 7 - 22 are now presented for examination. Claims 2 and 6 have been canceled. Claims 1, 13 and 18 have been amended to more particularly point out and distinctly claim the subject matter regarded as the invention. Claims 21 and 22 have been added to provide the applicants with a more complete scope of protection for their invention. Support for these amendments is detailed in the remarks that follow. No new matter has been added.

Claim 1 is independent.

Favorable review is respectfully requested.

The §103 rejection:

Claims 1 - 4, 6, 7, 8, 9, 10, 12, 13, 15, 17 - 20 have been rejected by the Examiner under 35 U.S.C. §103(a) as being unpatentable over Futch et al. U.S. Pat. No. 4,934,391 in view of Sachdev et al. U.S. Pat. No 5,888,308.

Claim 1 has been amended to more particularly claim that the method relates to removing rosin flux residue formed on electronic assembly surfaces, interfaces and

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under device surfaces during high temperature solder interconnections. Support for this amendment is found at least in the abstract on page 41, lines 8 - 11.

Claim 1 has been further amended to more particularly claim that in the first cleaning composition, which comprises a first water insoluble hydrophobic solvent with a surface active agent, the hydrophobic solvent are propylene glycol alkylethers represented by the formula $RO-(C_3H_6O)_N-C_3H_6OH$ wherein R is selected from the group consisting of propyl, butyl, pentyl and isobutyl and where $N = 0$ to 4. Support for this amendment is found at least on page 22, lines 11 - 15.

Claim 1 has been further amended to more particularly claim that the second immersion is with a cleaning solvent, without adding surfactant, which comprises a water insoluble hydrophobic propylene glycol alkylethers represented by the formula $RO-(C_3H_6O)_N-C_3H_6OH$ wherein R is selected from the group consisting of propyl, butyl, pentyl and isobutyl and where $N = 0$ to 4. Support for this amendment is found at least on page 20, lines 14 - 16 and page 23, lines 8 - 9. Accordingly, no new matter has been added. Applicants respectfully submit that independent claim 1, as amended, is not rendered obvious by the references.

The flux residue removal method of claim 1 is distinctly different from Futch at least in terms of the chemical nature and location of the flux residue and class of organic solvents used. In the present invention the method involves first steps (a) and (b) for swelling and removing the flux residue followed by steps (c) and (d), again using the same water insoluble solvent, but without surfactant, to remove the surfactant

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carrying first cleaning solution, then steps (e) and (f) involving the use of a water soluble solvent to rinse off the hydrophobic solvent with a hydrophilic solvent so that the surface becomes wettable by water in the final step to provide a thorough rinse with water to remove the hydrophilic solvent from the electronic assembly surfaces. This allows the elimination of chlorinated solvents such as methylene which is used by Futch and which is undesirable in light of current environmental regulations.

As the Examiner acknowledges on page 4 of the office action, Futch teaches a wash with water and then with methylene chloride and then again with water. This is in contrast to the present invention where the only water wash step is after the replacement of the hydrophobic solvent with a hydrophilic solvent. In the method disclosed by Futch the water wash directly after the hydrophobic solvent cleaning cannot be as effective even if there are surfactants present. Also, the water wash after the methylene chloride exposure cannot be effective because methylene chloride is water insoluble.

Sachdev does not remedy the above mentioned defects. Sachdev relates to the cleaning of conductive polymer screening pastes. These are raw pastes with no bake processing and have no relation to the flux residues and removal process disclosed in the present invention. Additionally, the cleaning chemistry disclosed in Sachdev is based on aqueous alkaline solutions which have no relation to the teaching of the present invention. Accordingly, neither Futch, nor Sachdev, nor a combination thereof renders obvious Applicants' amended claim 1.

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Claim 13 has been amended to correct the inadvertent omission that the hydrophilic water soluble propylene glycol methyl ether solvent is represented by the formula $\text{CH}_3\text{O}-(\text{C}_3\text{H}_6\text{O})_N-\text{C}_3\text{H}_6\text{OH}$ where $N = 0$ to 4. Support for this amendment is found at least on page 13, lines 1 - 2.

Claim 18 has been amended to be dependent from amended claim 1.

Claims 3 - 4, 7, 8, 9, 10, 12, 13, 15, and 17 - 20 depend, directly or indirectly, from claim 1. Since claim 1, as amended, is believed to be allowable, then claims 3 - 4, 7, 8, 9, 10, 12, 13, 15, and 17 - 20 are believed to be allowable as well. Claims 2 and 6 have been canceled thereby rendering their rejection moot.

Claim 16 has been rejected by the Examiner under 35 U.S.C. §103(a) as being unpatentable over Futch et al. U.S. Pat. No. 4,934,391 in view of Sachdev et al. U.S. Pat. No 5,888,308 and in view of Sugita et al. U.S. Pat. No. 5,218,979.

Claim 16 depends indirectly from claim 1. Since claim 1, as amended, is believed to be allowable, then claim 16 is believed to be allowable as well.

Claim 20 has been rejected by the Examiner under 35 U.S.C. §103(a) as being unpatentable over Futch et al. U.S. Pat. No. 4,934,391 in view of Sachdev et al. U.S. Pat. No 5,888,308 and in view of JP03004587.

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Claim 20 depends indirectly from claim 1. Since claim 1, as amended, is believed to be allowable, then claim20 is believed to be allowable as well.

New Claims:

Claims 21 and 22 have been added to provide the applicants with a more complete scope of protection for their invention. Support for claim 21 is found at least on page 18, lines 5 - 16 and page 26, lines 8 - 17. Support for claim 22 is found at least on page 22, lines 4 - 9.

Allowable Subject Matter:

The Examiner has stated that claims 5 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In view of the preceding remarks and amendments applicants respectfully submit that claims 5 and 11 are now allowable as dependent from claim 1, as amended.

Drawings:

The Examiner has noted that the application was filed with informal drawings and that formal drawings will be required when the application is allowed. Applicants will provide formal drawing when the application is allowed.

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Summary:

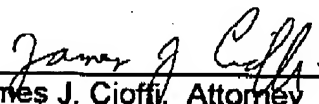
In view of all the preceding amendments and remarks, it is respectfully requested that any objections or rejections to this application be reconsidered and withdrawn. Further action with respect to the present application is earnestly solicited. If the Examiner finds this application is deficient in any respect, the Examiner is invited to contact the undersigned at the Examiner's earliest possible convenience.

For the foregoing reasons, allowance of the claims is respectfully solicited.

Respectfully submitted,

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